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# First record of four snapper fishes (Perciformes: Lutjanidae) from Odisha, East coast of India

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## Abstract

Present paper reports four snappers, namely *Lutjanus guilcheri, L. madras, L. quinquelineatus* and *L. vitta* for the first time from the coastal waters of Odisha. Their taxonomic accounts and distributional information are also provided for confirming their identity and range of distribution. The paper thus claims for the range extension of these four species to Odisha coast.

**Keywords:** Coastal Waters, Distribution, Gopalpur, *Lutjanus*, Range Extension

## Introduction

The snappers (Perciformes: Lutjanidae) are economically important food fishes because of their delicate taste and are highly esteemed throughout their range of occurrence including India, even though there exist rare reports of ciguatera poisoning by some of these fishes. The snappers are known to occur near the bottom of tropical and subtropical seas, from shallow water to about 550 m depth (Barman & Mishra, 2013). The snapper's family Lutjanidae comprises 21 genera and 138 species globally (Fricke *et al*., 2021), of which the genus *Lutjanus* forms the largest one in terms of total species. In a recent review, the family is represented by 10 genera and 46 species in India (Barman, 2017) and one more species was added by Praveenraj *et al*. (2018) taking it up to 47 species.

Pati *et al*. (2018) listed 13 species of snappers from the Odisha coast. Further, three more species, i.e., *Pinjalo pinjalo* (Bleeker 1850) by Barik *et al*. (2017), *Pristipomoides filamentosus* (Valenciennes, 1830) by Roul *et al*. (2019) and *Lutjanus lunulatus* (Park, 1979) by Mohanty *et al*. (2020), were reported, bringing the total number of snappers to 16 species from the Odisha coast. Based on recent collections, the present work reports four more snapper species, *Lutjanus guilcheri* Fourmanoir 1959, *L. madras* (Valenciennes, 1830), *L. quinquelineatus* (Bloch, 1790), and *L. vitta* (Quoy & Gaimard, 1824) from coastal waters of Odisha, forming their first record from Odisha state and reporting distributional range extension of these four species.

## Material and Methods

The Fish samples were collected from Gopalpur fish landing center (19° 15' 55.13" N, 84° 55'04.56"E) during October–November, 2021. The fishers captured these fishes by using hook and line. After collection, the fresh fish specimens were photographed and then preserved in 10 % of formalin. The specimens were identified using relevant literatures such as Allen (1985) and Barman

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(2017). Morphometric measurements were taken with a digital caliper of 0.1 mm accuracy. All the species are submitted in the National repository of Estuarine Biology Regional Centre, Zoological Survey of India, Gopalpur-on-Sea, Odisha, India.

**Abbreviations used**: D – Dorsal fin; A – Anal fin; P – Pectoral fin; V – Pelvic fin; LL – Lateral line scales; GR– Gill rakers; SL – Standard length; HL- Head length; EBRC – Estuarine Biology Regional Centre; ZSI –Zoological Survey of India.

## Results

Collected snapper (Lutjanidae: Perciformes) specimens were identified under the Ph.D. programme of the first author. Four species are hereunder reported as first records from Odisha state with taxonomic accounts and comments on distribution are presented.

1. ***Lutjanus guilcheri*** Fourmanoir, 1959: Yellowfin red snapper (Figure 1)

*Material examined:* EBEC/ZSI/F-13369, 1 ex., 216 mm SL, Gopalpur fish landing center, coll. R. Swain, 24th November 2021.

*Diagnosis*: D X, 14; A III, 9; P 17; V 1, 5; LL 56; GR 7+14. Body depth 2.67 and HL 2.74 times in SL; eye diameter 4.8 and suborbital depth 4.03 times in HL; preopercular notch and knob poorly developed; vomerine tooth patch diamond shaped; tongue with a patch of granular teeth; caudal fin slightly emarginated; scales above lateral line rise obliquely. *Colour*: Body reddish-orange and pectoral fins reddish-orange in life.

*Distribution*: Indian Ocean: known from Madagascar, Sri Lanka, and the Bay of Bengal (Froece & Pauly, 2021). India – Tamil Nadu (Murugan *et al.*, 2014), Andaman Islands (Talwar, 1990; Rajan, 2001) and Odisha (present report).

*Remarks:* This species was doubtfully listed from West Bengal (Talwar *et al.*, 1992) without any material evidence (Barman, 2017) and the same was followed by subsequent authors (Das *et al.*, 2007; Sanyal *et al.*, 2012). This species was also not reported from southern neighboring state Andhra Pradesh. The present work confirms its occurrence from northern part of Bay of Bengal and reports as first record from Odisha coast. It may possible that the species was earlier confused with *L. malabaricus* or *L. erythropterus,* while both the species are known to occur along Odisha coast (Barman, 2017).

2. ***Lutjanus madras*** (Valenciennes, 1831): Indian snapper (Figure 2)

*Material examined:* EBEC/ZSI/F-13367, 1 ex., 165 mm SL, Gopalpur fish landing center, coll. R. Swain, 27th October 2021

*Diagnosis*: D X, 13; A III, 8; P 16; V 1, 5; LL 51; GL 9+12. Body depth 2.95 and HL 2.78 times in SL; eye diameter 3.73 times, suborbital depth 6.19 times in HL; suborbital depth less than eye diameter; preopercular notch and knob well developed; vomerine tooth patch crescentic without medial posterior extension; tongue smooth, without teeth; 7 transverse scale rows on cheek; caudal fin emarginated; scale rows above lateral line rising obliquely. *Colour:* Dorsal surface of body brownish and fins yellow except pelvic fins.

*Distribution*: Indo-West Pacific: Seychelles and Maldives to New Guinea and the Philippines (Froece & Pauly, 2021). India – Tamil Nadu (Krishnan *et al.,* 2007), Kerala (Day, 1865), Andaman & Nicobar Islands (Talwar, 1990), Lakshadweep Islands (Allen, 1985) and Odisha (present report).

*Remarks:* This species also occurs in Lakshadweep Islands (Allen, 1985; Froece & Pauly, 2021), but not included in Rajan *et al.* (2021). As given the distribution map by Allen (1985) this species is available all along the east coast of India, but there was no material evidence of this species from Odisha, West Bengal or Andhra Pradesh (Barman, 2017). The present paper provides material evidence with regard to the occurrence of *Lutjanus madras* from the Odisha coast for the first time amounting to its first record from the state.

3. ***Lutjanus quinquelineatus*** (Bloch, 1790): Five-lined Snapper (Figure 3)

*Material examined:* EBEC/ZSI/F-13366, 1 ex., 175 mm SL, Gopalpur fish landing center, coll. R. Swain, 27th October 2021.

*Diagnosis*: D X, 14; A III, 8; P 16; V 1, 5; LL 60; GL 10+10. Body depth 2.73, head length 2.64 times in SL; eye diameter 3.31, suborbital depth 5.84 times in HL; less than eye diameter. Preopercular notch and knob

well developed; vomerine tooth patch crescentic without a medial posterior extension; tongue smooth, without teeth; scale rows above lateral line rise obliquely; caudal fin emarginated. *Colour:* Body bright yellow; brownish dorsally; five bright blue stripes on sides; a round black spot on lateral line below soft part of dorsal fin; fins yellow.

*Distribution*: Indo-West Pacific: from Persian Gulf and the Gulf of Oman to Fiji, north to southern Japan, south to New South Wales (Australia) and Lord Howe Island (Froece & Pauly, 2021). India – Kerala (Pillay, 1929), Tamil Nadu (Murty, 1969), Andhra Pradesh (Barman *et al.,* 2004), West Bengal (Ray *et al*., 2017), Andaman & Nicobar Islands (Day, 1871, as *Genyoroge grammica,* a synonym) and Odisha (present report).

*Remarks*: This species is known to have distributed along coasts of both the neighboring states, West Bengal in the north (Ray *et al*., 2017) and Andhra Pradesh in the south (Barman *et al*., 2004) along the east coast. It was probably confused with *Lutjanus kasmira* (Fabricius, 1775) in earlier works which is known to occur along the Odisha coast. The present report forms its first record from the Odisha coast.

**4. *Lutjanus vitta*** (Quoy & Gaimard, 1824): Blackstriped snapper (Figure 4)

*Material examined:* EBEC/ZSI/F-13370, 1 ex., 239 mm SL, Gopalpur fish landing center, coll. R. Swain, 25th November 2021.

*Diagnosis:* D X, 14; A III, 9; P 15; V 1, 5; LL 52; GL 9+10. Body depth 2.91 times and HL 2.67 times in SL; eye diameter 4.09 times and suborbital depth7.20 times in HL; preopercular notch and knob poorly developed; vomerine tooth patch crescentic without a medial posterior extension; tongue smooth, without teeth; 9 transverse scale rows on cheek; caudal fin slightly emarginated; scale rows oblique above lateral line but horizontal below. *Colour:* Dorsal profile of body brown

**Figure 1.** *Lutjanus guilcheri* (Fourmanoir).

**Figure 2.** *Lutjanus madras* (Valenciennes).

**Figure 3.** *Lutjanus quinquelineatus* (Bloch).

**Figure 4.** *Lutjanus vitta* (Quoy & Gaimard).

with a greenish tinge, lower sides and abdomen pinkish white, with a dark broad median lateral stripe on sides.

*Distribution:* Indo-West Pacific: Seychelles, Sri Lanka to New Caledonia, New Ireland (Papua New Guinea) and Gilbert Islands, northward to the Ryukyu Islands, Japan (Froece & Pauly, 2021). India – Andhra Pradesh (Barman et al., 2004), Tamil Nadu (Krishnan *et al.,* 2007), Gujarat (Barman *et al.,* 2000), Maharashtra (Barman *et al.,* 2012), Karnataka (Barman *et al.,* 2013), Kerala (Barman, 2017), Lakshadweep (Barman *et al.,* 2014), Andaman & Nicobar Islands (Rao *et al.,* 2000) and Odisha (present report).

*Remarks*: This species is reported from the southern neighboring state, Andhra Pradesh (Barman *et al*., 2004) most probably based on the distribution map given in Allen (1985), however it is not known to occur along West Bengal coast (Barman, 2017) to the north of Odisha. The

**Table 1.** Morphometric measurements and meristic counts of the reported species

| PARAMETERS | L. guilcheri | L. madras | L. quinquelineatus | L. vitta |
|---|---|---|---|---|
| Total length (in mm) | 277 | 212 | 221 | 288 |
| Standard length (in mm) | 216 | 165 | 175 | 239 |
| **In Percentage of SL** | | | | |
| Pre Dorsal length | 42.8 | 40.2 | 40.7 | 37 |
| Pre anal length | 72.2 | 73.8 | 72.8 | 69.2 |
| Body depth at dorsal fin origin | 37.3 | 33.8 | 36.5 | 34.3 |
| Head length | 36.4 | 35.9 | 37.7 | 37.4 |
| Pre pelvic length | 38.7 | 38.0 | 37.8 | 39.7 |
| Pre pectoral length | 35.5 | 33.2 | 35.1 | 35.3 |
| Eye diameter | 7.6 | 9.6 | 11.4 | 9.1 |
| Suborbital depth length | 9.0 | 5.7 | 6.4 | 5.1 |
| Maxilla length | 13.3 | 14.3 | 14.2 | 14.8 |
| Caudal penduncle length | 15.3 | 14.8 | 14.8 | 13.9 |
| Caudal penduncle depth | 12.5 | 11.2 | 10.9 | 10.8 |
| Pectoral fin length | 29.2 | 33.2 | 29.4 | 26.6 |
| Dorsal spine base length | 29.7 | 30.2 | 35.9 | 27.5 |
| Dorsal soft base length | 23.6 | 22.3 | 22.5 | 19.3 |
| Anal base length | 17.1 | 13.7 | 13.9 | 14.1 |
| Pelvic length | 19 | 21.7 | 22.3 | 18.6 |
| Length of 1st spine of dorsal fin | 4.7 | 5.5 | 6.9 | 4.9 |
| Length of 2nd spine of dorsal fin | 9.6 | 12.7 | 11.0 | 10.5 |
| Length of 3rd spine of dorsal fin | 11.8 | 14.1 | 14.3 | 13.7 |
| Length of 4th spine of dorsal fin | 14.1 | 15.6 | 15.7 | 14.3 |
| Length of longest dorsal spine | 14.1 | 15.6 | 15.7 | 14.3 |
| Length of longest dorsal ray | 11.2 | 12.5 | 9.9 | 10.2 |
| 1st Anal spine length | 3.3 | 4.8 | 6.2 | 3.7 |
| 2nd Anal spine length | 11 | 11.8 | 14.4 | 7.3 |
| 3rd Anal spine length | 7.2 | 13.6 | 9.8 | 9.7 |
| Length oflongest anal fin ray | 14.3 | 12.5 | 11.6 | 12.3 |
| **Meristic counts** | | | | |
| Gill rackers (incl. rudiments) | 21 | 18 | 20 | 19 |
| Lateral line scales | 56 | 51 | 60 | 52 |
| Lateral transverse scales | 9/15 | 7/14 | 7/19 | 8/17 |
| Dorsal fin spine | X | X | X | X |
| Dorsal fin rays | 14 | 13 | 14 | 14 |
| Anal fin spine | III | III | III | III |
| Anal fin rays | 9 | 8 | 8 | 9 |
| Pectoral fin rays | 17 | 16 | 16 | 15 |

present paper reports *Lutjanus vitta* as first record from the Odisha coast with material evidence.

## Discussion

Barman *et al.* (2007) enlisted 605 fish species under 138 families and 27 orders from marine and estuarine waters of Odisha. During the last decade around 63 publications have added 99 species as new records to Odisha coast. Barman *et al.* (2007) listed only eight species of snappers from the Odisha coast. At the same time, they have observed that *Lutjanus sanguineus* (Cuvier, 1828) reported by Mishra *et al.* (1999) is probably erroneous and based on specimens of *L. malabaricus* owing to a similar colour pattern, as there is no definite report of this species from the northern Bay of Bengal. Barik *et al.* (2017) reported *Pinjalo pinjalo* (Bleeker, 1850) and Karna *et al.* (2018) reported *Lutjanus rivulatus* (Cuvier, 1828). Pati *et al.* (2018) in a compilation added three more species, namely *Lutjanus fulviflamma* (Forsskål, 1775), *L. monostigma* (Cuvier, 1828) and *Pristipomoides argyrogrammicus* (Valenciennes, 1832) majorly based on digenean trematode work of Madhavi (2011), while fish identification by the author remains questionable. Moreover, there is no definite report of *P. argyrogrammicus* from Indian waters (Nair *et al.,* 2014; Barman, 2017). Recently, Roul *et al.* (2019) recorded *Pristipomoides filamentosus* (Valenciennes 1830) and Mohanty *et al.* (2020) reported *Lutjanus lunulatus* (Park, 1797) from the Odisha coast. Thus, 16 species of snappers are reported from the Odisha coast. At the same time, occurrence of *Lutjanus monostigma, L. sanguineus* and *Pristipomoides argyrogrammicus* remains questionable and needs to be verified with material support.

Owing to have red colouration, *Lutjanus guilcheri* seems to be closely related to *L. erythropterus, L. malabaricus* and *L. sanguineus*. Concavity of dorsal profile of head distinguishes this species from all other three species mentioned here. Further, *L. sanguineus* have a prominent hump on forehead and series of shallow, horizontal grooves behind eye in specimens above 20 cm SL (vs absent in *L. guilcheri*) (Allen, 1985). Maxilla length is about equal to distance between bases of last dorsal and anal rays in *L. malabaricus,* while it is distinctly less in *L. guilcheri* specimens (Allen, 1985). Total rakers on first gill arch are 18 or 19 in *L. erythropterus* (vs 21 in *L. guilcheri*) and interorbital width relatively wide, 3.5 to 4.8 times in HL in *L. erythropterus* (vs 5.8 to 6.0 times in HL in *L. guilcheri*) (Allen, 1985).

Both *L. madras* and *L. vitta* are closely similar in colour with *L. lutjanus,* which can easily be distinguished in having narrow space between eye and maxilla, more than 9.2 times in HL (vs less than 8.9 times in *L. madras* and *L. vitta*) (Allen, 1985). Apart from having differences in colour as stated under species description above, *L. vitta* is known to have more transverse scale rows on cheek (8-10 rows vs 6 or 7 rays in *L. madras*) (Allen 1985).

*Lutjanus quinquelineatus* is similar to *L. bengalensis* and *L. kasmira* in having blue stripes on sides. *Lutjanus bengalensis* differs from *L. quinquelineatus* in having more dorsal fin spines (11 or 12 vs 10) and more gill rakers (including rudiments) on lower arm of first arch (17 to 20 vs 13 to 15) (Barman & Mishra, 2014). *Lutjanus kasmira* have less number of cheek scales (5 or 6 rows vs 10 or 11 rows in *L. quinquelineatus*) and 4 blue horizontal blue stripes on sides (vs 5 or 6 stripes on sides in *L. quinquelineatus*). While another blue striped snapper, *L. coeruleolineatus* (Rüppell, 1838) does not occur in Indian coast (Barman & Mishra, 2014), record of *L. notatus* from Visakhapatnam, Andhra Pradesh (India) (Govinda Rao *et al.,* 2017) also needs further examination. The figure by Govinda Rao *et al.* (2017) shows their specimen having only four blue stripes on sides, characteristic of *L. bengalensis,* while *L. notatus* have six narrow blue stripes on sides. Their gill raker count possibly misses the rudiments and thus, there was lower count and so, we consider it as misidentification of *L. bengalensis.*

Thus, the present paper reports first record of four snapper species, i.e. *Lutjanus guilcheri, L. madras, L. quinquelineatus,* and *L. vitta* from the Odisha coast collected from fish landing center of Gopalpur-on Sea, Ganjam, Odisha, India.

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